Dope on the UT-4

Alberto Gherardi, I5BSM
P.O. Box 177 - 150100 FIRENZE, Italy.

I assembled about one year ago a UT-4 using some beautiful PC boards supplied by Clyde Keenan (K7WTQ) and I have had excellent results. The only problem I have had is with the power supply of +5 V. With the advice of Pete (W6KS) I modified the power supply circuit as shown in the diagram. Now everything works to perfection.

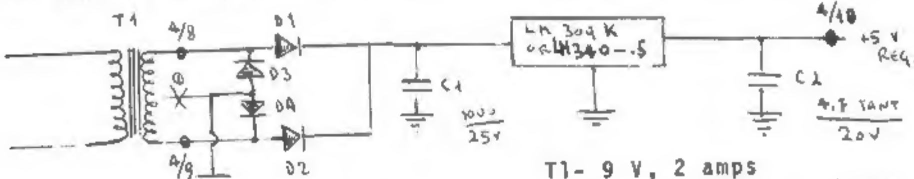
*I have also added the "repeat switch S-8": I cut the interested printed conductors and I connected them with insulated wires to a "3 lead socket connector" (miniature type) which had been fastened to the PC board. With a proper plug I connected the 3 leads to the circuit as described in the RTTY JOURNAL March 1975.

*To regulate the voltage at pin 2 of IC-1a, I used a "23 turn pot" (10K) in place of the resistor of 8200 Ohm.

*To be able to control the "lock" of the TU unit, I use the Dovetron MPC 1000, with the T/R switch (S-3), I changed the ST-6 standby NPN transistor (2N2222A) with a HEP 706.

*Recently I have assembled another UT-4 using the same PC boards supplied by Clyde. I noticed that on board n1, labelled **Mod. 2.**, between pins 13 and 14 of IC 5 (7420) there is no bridge. I had to make the connection for proper function.

*I also added a resistor of 4700 Ohm ¼ W between pin board connector "K" (pin 12 IC 5b) and "D" (+V) of the PC board (Uart/FIFO's) because it was missing.



T1- 9 V, 2 amps
(or better)- 8 V, 2 amp
* Do not use center tap.

D1- D4= 50 PIV,2,5 A Diodes-Hep 170-

****

RTTY JOURNAL
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RTTY JOURNAL

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Volume 25, No. 4

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WINNERS - 1976 RTTY ART CONTEST

1976 RTTY ART CONTEST RESULTS

This is the third year we have held a contest in the creation of RTTY art. But this year, it seemed that interest in this area has gone down since there were only four entries. If this trend continues, the contest will probably be discontinued. Suggestions any may have for the future of this contest should be sent to Don, WA6PIR, 18765 Santa Isadora St., Fountain Valley, CA 92708.

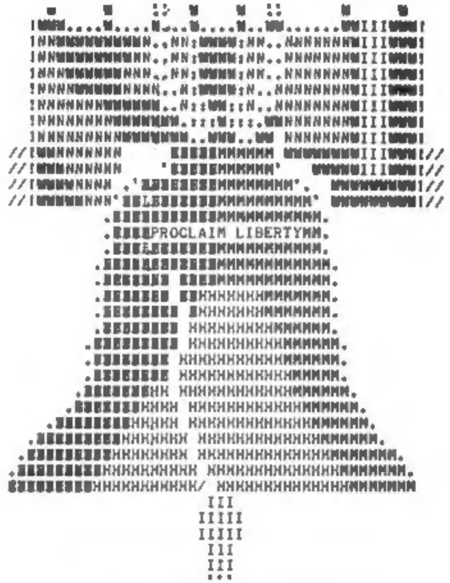
The judges have completed their review of the four entries and the results are as follows:

First Place	RICK, W8ADE - Liberty BELL
Second Place	RAY, VE3WI - NANCY
Third Place	DICK, WA1PWF - Paul REVERE'S RIDE
Honorable Mention	SHEL, W3FVU - Happy SANTA FACE

Both W8ADE and WA1PWF have been entrants in the prior year contests who chose the bicentennial subjects for this year. The effort of VE3WI is a portrait of his daughter. The picture by W3FVU was his first try at RTTY art.

Our congratulations to the winners and our appreciation for their entries.

DON, WA6PIR; JOHN, K2AGI; NEIL, K9WRL; RICKY, WA0CKY; and JOE, WA9UGE.



"LIBERTY BELL"
ORIGINATED FOR RTTY BY RICK, W8ADE, MARION, OHIO
1ST PLACE - 1976 RTTY ART CONTEST

*****

RESULTS OF THE WAEDC 1976 RTTY DX-CONTEST

Single OP

	Points		
		K6WZ	12400
		ZP5WO	9344
CT1EQ	170317	SM6ASD	9322
I8AA	118065	SM5EIT	8280
I5GZS	79002	OZ4FF	6850
I5KPK	74191	OZ4DZ	6512
I1COB	63896	WOMT	4920
F8XT	56742	DJ9MQ	4824
HB9AVK	44422	VE2QO	4662
DJ6JC	39754	OK2BJT	2640
DJ4KW/4X	39308	PA0CWI	1581
OK1MP	39304	F8RZ	1482
DL6BI	29106	YV5GU	1275
SM6AGV	27612	OK1KZE	840
LZ1KAB	23808	DJ3TI	676
I5HZZ	22022	DL1OY	544
DJ2YE	21080	DL8KQ	360
WA0YDJ/4	18232	DJ1QT	264
DJ9IR	16008	OH3IH	168
IT9VBJ	14637	DK4IS	140
I3FUE	13231	EA3AHM	96
DL8QP	12546	SM6CAL	64

Multi OP

I1PYS	169257
W1MX	57400
DL0TS	56575
UK3ACR	49644
UK2GAX	49280
G4ALE	28842
OK1OFF	20701
DL0BU	18762
UK2BAB	17236
OH1AR	11473
G3UUP	11125
TF3IRA	6118
OH1AD	4680
SK6AW	2160

SWL

I3–13018	55945
OK2–5350	41250
I3–14258	17784
I4–14707	17664
I1–56889	11200
HE9KNO	3726

INTRODUCING the DTU-1.

Part 2. of 2 Parts

RICKY JOHNSON, WA0CKY
1860 Pawnee
LINCOLN, NB. 68502

USING THE DTU-1

Last month we introduced the DTU-1, a TTL device for converting a standard cassette recorder into a complete digital tape system for the storage of large quantities of teletype information on magnetic tape. This month we will discuss the various uses of the unit.

Power Supply:

Before the unit can be used, a power source must be provided. The DTU-1 requires about 800 ma. of +5 volts and 30 ma. of —12 volts. The power supply shown in Fig. 6 will meet these demands. The LM309K regulator should be mounted on the chassis to dissipate the heat. Be sure and mount the 1 mf tantalum capacitor directly on the regulator with as short of leads as possible. The small disk capacitors in parallel with the large filter capacitor are required to insure stable operation of the circuit.

Switch Functions:

All switches in last months drawings were shown in their "normal" positions.

S-1 and S-2: Provide manual control of the cassette recorder motor.

S-3: Sets the buffer for record or playback. It also is wired so that the DTU-1 will not require a stop pulse on record but will require one on playback. •Experience has shown this to prevent the most errors and to allow editing if a "hit" is received.

S-4: Selects the baud rate to be received or transmitted and also, when S-3 is in playback, establishes the necessary 1.42 unit stop pulse via IC 6.

S-5: Prevents the buffer from outputting characters.

S-6: Besides clearing memory this switch also sets the master control circuit for record or playback depending on the setting of S-3 when the clear switch is closed. It also will turn on the tape recorder motor when S-3 is in playback and turn it off when S-3 is in record.

S-7: Records the last few characters of the data being recorded.

S-8: This switch does exactly the same things as S-6 except that the memory is not cleared.

S-9: Reduces the gap between character groups slightly and allows the recording of a new character block on top of an old block. If higher tape density is wanted, leave S-9 closed when recording. No tape editing will be possible on data recorded with S-9 closed.

Initial Testing:

Set S-3 to record and momentarily close the clear switch. Set S-4 to match the baud rate of the printer. Set S-5 to load. Now type a short sentence, of less than 80 characters, on the printer. Set S-3 to playback. If the buffer and clock are working properly, the sentence will print out again when S-5 is returned to "normal".

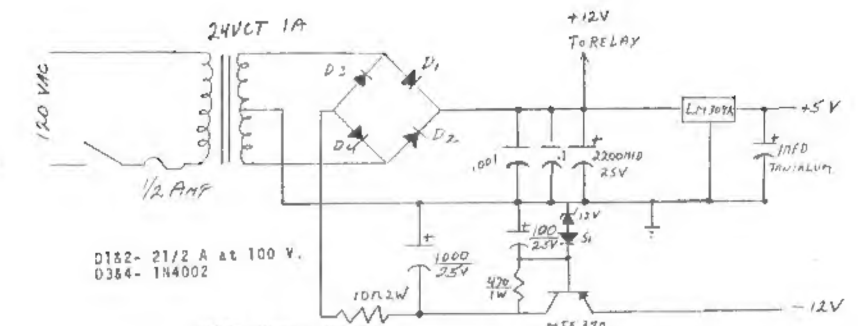
Next test the operation of S-1 and S-2 by putting a cassette in the Recorder and setting the recorder for record. Momentarily pressing these two switches should turn the motor off and on. With S-3 set for record, press S-2 to turn on the motor. Pressing reset or closing the clear switch should turn the motor off. Set S-3 for playback and press S-1 to turn the motor off. Now pressing reset or closing the clear switch should turn the motor on. Test the counters by setting S-3 to record, momentarily close the clear switch. S-5 should be in its "normal" setting. Type exactly 70 characters on the printer. The motor should turn on for about two seconds when the 70th character is typed.

Recording:

Put the recorder in its record mode after closing the clear switch. Next set the switches as follows: S-3 record; S-4 to the baud rate of the signal to be recorded; S-5 normal; S-9 normal. Just before you begin to record open the clear switch S-6. If no "leader has been recorded press S-2 to start the recorder recording a blank section of tape. About 5 index counts should be plenty. Now press reset S-8 to stop the motor and clear the counters. The DTU-1 will now record anything found on the loop. At intervals you should see the motor turning on and off and the record level meter, if any, jumping up a half second after the motor turns on. Surprisingly this is all the time needed even in cheap recorders to bring the tape up to speed. Most recorders have an auto-level control and this is adequate to set the proper recording level. In the case of a manual level control, set it so the level indicator is as high as permissible. After the data has been recorded, press the run out switch to record the last few characters left in the buffer and then press it again to record a trailer of blank tape.

Playback:

Rewind the tape so the index counter indicates you are somewhere in the leader.



POWER SUPPLY FIGURE 6

USE WITH LT-4

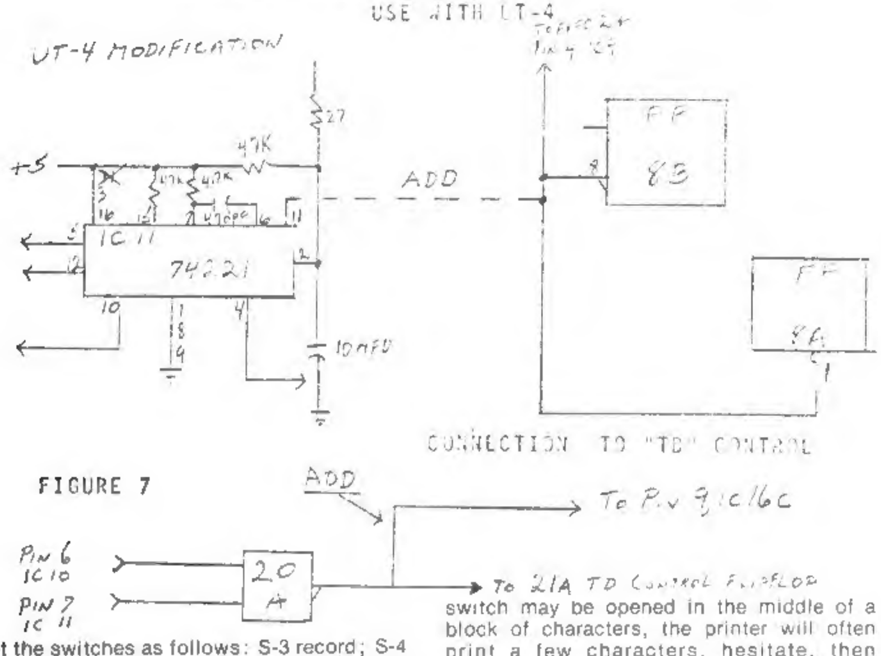


FIGURE 7

Set the switches as follows: S-3 record; S-4 to the baud rate of your printer; S-5 load; S-6 clear; S-9 is not working. Start the recorder in the playback mode and open S-6. When the first character block is encountered, it will be read into the buffer and the tape will stop. To begin playback, set S-5 to normal. Playback can be interrupted at any time by the use of S-5. The volume level will have to be set by trial and error. The input circuit requires a fairly high level and the recorder should be set to as high of volume as possible before its audio section overloads. It is almost impossible to overload the input section of the DTU-1.

To playback from the middle of a selection, close the clear switch, then start the recorder in playback. Opening the clear switch will start the playback. Since the clear switch may be opened in the middle of a block of characters, the printer will often print a few characters, hesitate, then continue normally. This hesitation is normal and is caused by the DTU-1 regaining sync with the character blocks.

Editing:

With the DTU-1, it is possible to "lift out" a character block containing an error or errors and replace it with a new, error free, block. Since the old block had 70 characters, the new block must also have no more than 70 characters. It can have about 20 less characters though. The following instructions will seem complicated, but once they have been followed a few times, you can do the edit operation in a very short time. Far

CONTINUED ON PAGE 9

RTTY theory & applications

Ron Guentzler, W8BBB, Editor
212 Grandview Blvd.
Ada, OH.45810

RTTY SIGNAL BANDWIDTH

Part 6 - FSK Spectrum and Bandwidth

In this series, we have been discussing the spectrum of RTTY signals. Last month, we gave the spectrum of several repeated TTY characters using the Bell System 7.42-unit code at 45.45 Baud (61.3 Speed). We also gave the spectrum or frequency components of a square wave having the same amplitude and Baud rate as the TTY characters. It was shown that the square wave has a spectrum that appears quite dissimilar to that of a repeated TTY character, but, although the square wave does not contain the "fine" structure of the TTY character, it does have the same general frequency spectrum. Therefore, the square wave should be a suitable (or even, desirable) substitute for a TTY signal.

This month we are going to show the spectrum resulting when a 45.45 Baud square wave is used to frequency modulate a carrier.

Frequency shift keying is used almost exclusively on the HF bands; it is a true frequency-modulation process. On the VHF bands, use is made of audio frequency shift keying which is applied to the audio input of either an AM or FM transmitter. When applied to an AM transmitter, the AFSK portion of the modulation process is true FM. When AFSK is used with FM, true FM is used twice. Therefore, no matter what means of keying is used (so long as it is one of the common methods mentioned, and not make-and-break keying which is AM), it is always a frequency modulation process.

Unfortunately, mathematical analysis of FM other than the single tone modulation which is used as an illustration in most textbooks is almost impossible to handle! This is known as multitone FM. Therefore, we are not going into the mathematics behind frequency modulation because square wave modulation of an FM transmitter is just too gross mathematically. If anyone is interested in the mathematics for multitone FM, we recommend: MODULATION, NOISE, AND SPECTRAL ANALYSIS, Philip E. Panter, McGraw-Hill, 1965. (Incidentally, this book is excellent for modulation and demodulation of other than multitone FM.)

Utilizing Panter's formulas (7-79) and (7-80), we applied a 45.45 Bd. square wave to a frequency modulator. Some of the results are shown in the Table and in the Figure.

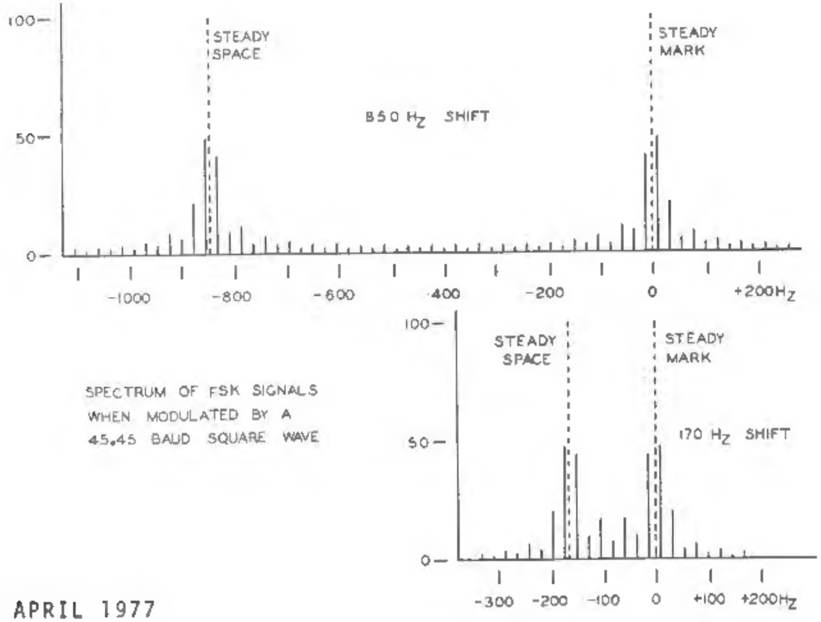
Before proceeding with a discussion of the results, it would be best to firmly establish the terminology used here, used in the "telegraph business", and used for "ordinary FM" work. Let's begin with "ordinary FM" because it is very widely used and most text books use its terminology. When frequency modulating a carrier, the carrier is thought to swing up and down in frequency, in equal amounts, from the carrier frequency. The swing is referred to as the frequency deviation and is usually given as a plus and minus number such as plus and minus 75 kHz for FM commercial broadcast; the plus and minus 75 kilohertz amounts to a total swing of 150 kHz. The modulation index (commonly called beta), is the ratio of the frequency deviation to the modulating frequency. For example, if a pure 10 kHz sine wave were applied to the microphone input on a commercial FM transmitter and it caused the carrier to swing up and down by 75 kHz, the modulation index would be 7.5. With FSK telegraphy, the carrier is thought to be at one extreme (usually the high frequency end, corresponding with the so-called Mark frequency) and when a Space is sent the carrier shifts down to a lower frequency. Thus FSK is considered to be a "one-sided" FM with only a single direction of shift. Unfortunately, all the mathematics for FM is well established for the "ordinary FM" situation. Fortunately, with only a slight change in terminology it is possible to change the telegraph FM to ordinary FM and, if one is aware of the change, it is simple, clean, and no confusion will result.

Now for the conversion: With 850-Hz shift of a telegraph signal, the spectrum is calculated as though a plus and minus 425 Hz shift were being made from a carrier placed half way between the Mark and Space frequencies. In the table, the zero term represents the signal amplitude at a frequency 425 Hz below Mark and 425 Hz above Space. In the Figure, however, it is plotted as minus 425 Hz. That is, the table values correspond with "ordinary FM" terminology, but the values in the figure corresond with telegraph practice. For the 170-Hz shift case, the table is set up for plus and minus 85 Hz, but the figure is drawn for 170-Hz shift down from Mark.

The results given in the Table are for a modulation index (beta) of 18.7 which is close to a frequency shift of 850 Hz and a modulation index of 3.74 which is close to a carrier shift of 170 Hz. The carrier amplitude (unmodulated) was taken as 100; this has the benefit that the results are directly in percent. The frequency given in the second column is the side frequency ("sideband" frequency) from the center or arithmetic mean frequency of the transmitted signal; in every case except the zero term, it represents two side frequencies, one above the center frequency and one below.

SPECTRAL COMPONENTS OF AN FSK SIGNAL MODULATED BY 45.45 Baud DOTS
Carrier Amplitude - 100.0

		849.91 Hz SHIFT			169.983 Hz SHIFT		
Term	Freq. (Hz)	Amplitude	% Total Power	Cum %	Amplitude	% Total Power	Cum %
0	0.000	3.03	.09	.09	6.76	.45	.45
1	22.725	1.54	.04	.14	16.82	5.66	6.11
2	45.450	3.06	.18	.32	9.46	1.79	7.91
3	68.175	1.58	.05	.37	43.81	38.38	46.29
4	90.900	3.17	.20	.58	46.98	44.15	90.45
5	113.625	1.66	.05	.63	19.84	7.87	98.33
6	136.350	3.38	.22	.86	4.29	.36	98.70
7	159.075	1.79	.06	.92	6.24	.77	99.48
8	181.800	3.71	.27	1.20	1.89	.07	99.55
9	204.525	2.01	.08	1.28	3.26	.21	99.76
10	227.250	4.24	.36	1.64	1.09	.02	99.78
11	249.975	2.36	.11	1.75	2.04	.08	99.87
12	272.700	5.15	.53	2.29			
13	295.425	2.99	.17	2.46			
14	318.150	6.90	.95	3.42			
15	340.875	4.33	.37	3.79			
16	363.600	11.32	2.56	6.36			
17	386.325	8.90	1.58	7.94			
18	409.050	41.28	34.09	42.04			
19	431.775	47.78	45.67	87.71			
20	454.500	21.08	8.89	96.60			
21	477.225	5.91	.70	97.30			
22	499.950	7.89	1.24	98.55			
23	522.675	3.01	.18	98.73			
24	545.400	4.68	.43	99.17			
25	568.125	1.96	.07	99.25			
26	590.850	3.25	.21	99.46			
27	613.575	1.42	.04	99.50			
28	636.300	2.44	.11	99.62			
29	659.025	1.10	.02	99.64			
30	681.750	1.92	.07	99.72			



SPECTRUM OF FSK SIGNALS WHEN MODULATED BY A 45.45 BAUD SQUARE WAVE

"% TOTAL POWER" gives the percentage of the total transmitted power present in the two side frequencies having the same frequency difference from the center; i.e., for the 850 Hz shift example, o.20% of the total transmitted power is concentrated in the two side frequencies that are 90.9 Hz above and below the center frequency. It is interesting to note that practically all the power is concentrated in the vicinity of the nominal Mark and Space frequencies. The column headed "CUM %" is a running total or cumulative total of the power in the side frequencies starting at the center.

The results were calculated out thru the 49th term; thus a total of 99 spectral terms were calculated for each shift. To conserve space, the table lists only the terms out to the last one with an amplitude of 2% of the unmodulated carrier.

The figure shows, graphically, the spectrum resulting when a 45.45 Bd. square wave is applied to a frequency modulator (FSK). The unmodulated carrier amplitude is 100. The spectrum plots give amplitude as a function of frequency.

The spectrum plot given in the figure simply shows the values given in the table, but arranged in a more meaningful, but less accurate, manner. For the 850-Hz shift case, zero frequency in the table corresponds with -425 Hz in the figure; 68.175 Hz in the table corresponds with both -357 Hz and -493 Hz in the figure. For the 170-Hz case, zero frequency in the table corresponds with -85 Hz in the figure and 113.625 Hz in the table corresponds with both -198 and +28 Hz in the figure.

The two noteworthy parts of the figures are that a signal exists between the nominal Mark and Space frequencies and that the signal exists quite a distance beyond them (below Space and above Mark). Therefore, an FSK signal does not occupy just the Mark and Space frequencies, but a whole range of frequencies much wider than the nominal frequency shift.

Now comes the question: what is the bandwidth? The basic problem with defining bandwidth for an FM signal (and also for the Fourier series of something like a square wave) is that the signal components exist out quite far in frequency (or to infinity with a square wave), but the components become quite small for the high frequencies. Therefore, the bandwidth definition must be somewhat arbitrary or must be defined by some legal authority.

The first approach we are going to take will be to consider that all terms with an rms value greater than 2 percent of the unmodulated carrier (or 2 percent of the rms value of the total transmitted sidebands) are of significance. A value of 2% of the carrier is 34 dB down. From the table it can be seen that for 850-Hz shift, term 28 is the last one with an rms value greater than 2% of the unmodulated carrier. Therefore, the bandwidth of an 850-Hz shift FSK signal is 1272 Hz or 1.5 times the nominal shift. The bandwidth of a 170-Hz shift signal is 500 Hz or almost 3 times the nominal shift. Also, the 850-Hz shift signal is approximately only twice as wide as the 170-Hz shift signal even though the nominal shifts are in a 5 to 1 ratio!

A second approach is to include all terms that are less than 30 dB down from the unmodulated carrier. 30 dB equals an amplitude of 3. Therefore, the nominal 850-Hz shift requires a bandwidth of 1181 Hz, and the 170-Hz shift requires a bandwidth of 409 Hz.

A third approach is to use a more-or-less arbitrary formula. For example, the Fifth Edition of the IT&T Handbook, p. 1-21, gives: Bandwidth of a F1 signal = 2.6D + 0.55B for beta between 0.75 and 2.75 and Bandwidth = 2.1D + 1.9B for beta between 2.75 and 10, where D is the frequency deviation and B is the Baud rate. For 850-Hz shift, beta = 9.35, therefore the necessary bandwidth is 979 Hz and for the 170-Hz shift, beta = 1.87, and the bandwidth is 246 Hz.

VHF NEWS

We just received the following operating information about the RTTY repeater, WR7AKA, in the Seattle area from Barry Simpson, WA7HJR, in Tacoma, WA: "Several months ago I wrote to you telling of our plans for a 450 MHz RTTY repeater (RTTY J, 1976 MAR). The 146.10/.70 pair had been assigned to another group who planned using 850 Hz shift, and since we were interested in 170 Hz shift only, we had no better choice. Well, the 146.10/.70 MHz pair unexpectedly became available, and we now have a temporary split-site system in operation. 170 Hz shift only with 2125 Hz Mark and 2295 Hz Space, at 60 WPM. All inputs are regenerated thru the use of a UART and a crystal-controlled AFSK oscillator at the transmitter site. We are currently working on a new single-site system which we expect to locate at 3000 feet. Anyone interested in RTTY is welcome to use the repeater and to join the "Puget Sound RTTY Repeater Group".

Thanks again, Barry - nice to have information - and **follow-ups**.

Well, that's it for this month. Keep the information coming, please.

73 ES CUL, RG.

* * *

RTTY-DX

John Possehl, W3KV, Editor

P.O. Box 73, Blue Bell, PA.19422

Hello there . . .

For the certificate hunter, we note that the Scandinavian Amateur Radio Teleprinter Group (SARTG) has expanded their popular WSRY Award by adding three additional classes to the basic Diploma. The basic Award is the General Class and you can now earn a Bronze, Silver, and Gold Ribbon for attachment thereon. The rules are as follows.

All stations who have had Two-Way RTTY contact with the indicated number of Scandinavian stations can claim the WSRY Award(s).

	General Class	Bronze	Silver	Gold
Scandinavian Stations	25 QSO's	50 QSO's	75 QSO's	100 QSO's
Other European Stations	16 QSO's	35 QSO's	50 QSO's	75 QSO's
All Others	8 QSO's	15 QSO's	25 QSO's	50 QSO's

The General Class must be obtained before applying for the Bronze, Silver, and Gold Ribbon. Any band may be used or any combination of bands.

QSL cards for the General Class, Bronze, Silver Ribbon are not necessary, just submit a list containing: Call, Date, and Time of contacts.

For the Gold Ribbon it is essential to have had contacts with the following prefixes: LA - SM - OH - TF - OX - OY - OZ. Reference to a SARTG Contest Log or photo copy of the 7 QSL's is sufficient.

Fee - General, 10 IRC; Bronze 6; Silver 6; Gold 6 (or equal amount in funds).

Send claims to -- SARTG Contest and
Awards Manager
Carl Jensen OZ2CJ
Meisnersgade 5
8900 Randers, Denmark

You no doubt have noticed the tremendous increase in RTTY activity from Finland in the past couple of months. It once was that OH stations were very rare indeed but now you can find them on the band almost any day. Some of them printed here recently have been OH1PS, OH2HN, OH2TO, OH3TT, OH6AA, OH6AD, OH6JG, OH8AV, OH8SW, and OH0NI. The last is not the least however, Sigge, OH0NI, on Aland Island, enjoys separate country status for DXCC, and oddly enough he was the first of the OH stations to become active on RTTY. This event took place on 1 May 1972 in a QSO with SM3AVQ, who, incidentally got Sigge started by supplying the TU. That first year he had 137 QSO's with a gradual lessening of activity in subsequent years. The low point was in 1976 with only 12 contacts. However, between 1 January and 17 February of this year, he has already had 111 QSO's, so those of you that need this country should have no trouble finding him. He works all bands 15 thru 80 meters, and he has just completed WAC. He will be in the BARTG Contest coming up at about the time you read this.

Wonder which of the OH gang will be first to put RTTY on from Market Reef (OJ)? Sigge was there on a DXpedition in 1970 so he knows what it is like.

A few issues back we mentioned that Bob, WB8JEY, was to make a repeat visit to St. Vincent with a possible side trip to one of the islands in the Grenadines. Here is an update on the operation. Bob was still on Palm Island at this writing but was scheduled to leave at around mid March. We had occasion to contact him in another mode and he was signing VP2SY. Bob tells us that on this trip down there the equipment was knocked around quite a bit, requiring quite a bit of repairs. Things were patched up and John, VP2SV, had been giving out RTTY contacts thru most of February. The equipment will remain with John and he intends to keep it active. Obtaining permission to operate from the Grenadines was not successful this trip as a passport was an important requirement and Bob did not have his with him. In the meantime John may possibly make a trip there in the future. We will have to wait and see.

During February a rare showing was made by Iwan, UB5SR, who at present is the only active RTTY station from the Ukraine. Igor, UW3HQ, has been quite active also and puts a good signal into the States.

We made a brief mention of 9K2EP last month and later found out that the operator is none other than Bo, SM0OS, and YA 1 OS back in 1972. You might recall that the authorities closed down amateur activities in the latter country and it just so happened that Bo was in the midst of a RTTY Contest. He was given a receipt for the gear which he later got back.

The latter part of February saw renewed activity from the Islands of St. Pierre et Miquelon and this promises to be more sustained than the previous brief DXpeditions to that rare spot. Paco, XE1WU was first to operate from there as FP0WU back in 1971 and again in 1973 Dave, WA2EXP, made a trip to the island along with George, W2JNO, for a combined RTTY SSTV operation. The present activity is by a permanent resident and has promise of continuing indefinitely. FP8DF is the call and Pierre is the name. He puts out a terrific signal to this area from a Collins S Line into a Heath SB-220 Linear into a Dipole. Machine is a Sagem and TU is an ST-6. The speed of 45 baud and shift of 170 hz is just perfect.

W.A.C. 14 Mhz.

Nr. 37	Norm Davis	W1GKJ
Nr. 38	Bruce Balla	VE2QO
Nr. 39	Fred Kienzle	K4ZS
Nr. 40	Sigge Mansneras	OH0NI
Nr. 41	Jim Watson	WA0YDJ/4

Quite a total for one month and congratulations to the above for the fb achievement in RTTY. Africa seems to be the most difficult to get a QSL from these days. However the boys on the Canary Islands (EA8) have been doing a good job in that department lately so you might look for them particularly in the Contests, there are about three active stations from there.

As we go into the third month of 1977 we can safely say (?) that all applications for the Bicentennial W A S Award are in hand and it is with pleasure that we publish the complete list of those stations that have successfully accomplished this difficult feat. As the certificates were not numbered they are listed in the order received, top to bottom.

K7BV	Ed McGinley
W7VKO	Cecil Armstrong
K6WZ	Carl Steavenson
W7VCM	Jack Taylor
K4GKW	Jim McAdams
W5EUN	Mark Thompson
K4YZV	Art Bradley
W7KS	Earl Crawfis
WA3JTC/ZP5	Dick Manahan
HI8XRM	Bob Meyer
WA2YVK	Frank Fallon
WA0YDJ/4	Jim Watson
WA9WJE	Walt Schrader
WA4HLP	Al Mitchell
W1GKJ	Norm Davis
VE2QO	Bruce Balla
W0OGH	Larry Godek
W0CY	Jim McKim
K3RVC	Neal Haslam
WA6NGM	Ernest Garcia
K0HSC	Carroll Westphall
W5VJP	Bob Wagner

The following stations completed their WAS requirements during 1976, however, many of the States were confirmed in prior years. They are awarded the RTTY Journal Merit Award for WAS as follows.

Nr. 6	Cliff Pittelkau	W4CQI
Nr. 7	Doug Williamson	WA8NGJ
Nr. 8	Hal Beebe	W9OEQ (W9RY)

QSL Information --

FP8DF Pierre Cloony, P.O. Box 41, St. Pierre et Miquelon, North America.

OH0NI Sigurd Mansneras, Skillnadsgatan 37, MARIEHAMN, Aland Island, Finland.

UB5SR via P.O. Box 88, Moscow, USSR.

UW3HQ - same

73 de John

***

DTU-1

CONTINUED FROM PAGE 4

less time than splicing punch tape and no mess.

First the block with the error must be identified and all characters in it printed out so that the new block will be entered correctly with the right end point. To read out an individual block of characters, start the playback a bit ahead of the block you wish to read out. Once the tape stops moving, hold closed the motor off switch. When the print stops, you have the tape positioned between blocks and the next character to be read will be the first character of the next block. Now press reset and when the motor stops hold closed the motor off switch. When the print stops you have completed reading the block. Once the block to be edited has been so identified, rewind the tape and read up to the block involved. Close S-9, set S-3 to record, and momentarily clear the buffer. Set the recorder for record and type in the block correctly. If you make a typing error on the first 69 characters, just press clear and start over. When the 70 character is typed, the block will be recorded automatically and the old block erased.

The value of the time constants used on IC 23 are quite critical to the editing procedure. The values shown worked on the two recorders I have at my disposal. One cost $20 and the other lists for $80 and I believe them to vary enough to make the choice of time constants used acceptable for most recorders. In the case of errors resulting from the editing procedure, change the values of the 15K and 47K resistors as follows: If the beginning of the block following the edited block contains errors, reduce the value of the 47K resistor: If the first few characters of the block that was just re-recorded are in error, increase the value of the 15K resistor.

Use with the UT-4

When using the UT-4, the transmitted

baud rate is determined by the UT-4, not the DTU-1. The DTU-1 will be set for the baud rate of the printer (usually 74.2). When down converting a "TD" control is necessary. Before adding this control, one modification to the UT-4 must be made. The modification came from Irv Hoff and should be made in all UT-4's, not just those to be used in conjunction with the DTU-1. Disconnect pin 11 of IC 11 from the +5 volts line and reconnect it to pin 8 of IC 8. See Fig. 7. The change will prevent the counters from receiving an up and down count simultaneously and resulting in a false count.

The "TD" control for the DTU-1 is taken from IC 20A which goes low when any count between 72 and 79 is present. This low, when fed to IC 16C in the DTU-1, will prevent any characters from being outputted from the DTU-1. The effect of this interconnection is to allow the UT-4 buffer to fill to 72 characters and then stay there during the rest of the transmission. The output speed (as opposed to the baud rate) of the DTU-1 will automatically set itself to the output speed of the UT-4. Print on the printer will be constant rather than on-again-off-again as with the TD control used when a tape distributor is being used. I find the steady output much easier on my "nerves".

When down converting in this manner, the rate control on the UT-4 should be retarded slightly. Otherwise the UT-4 will output with nearly 7.0 code and make reception more difficult. An alternative is to set the UART in the UT-4 for two stop pulses. To check that the output is not too fast, at 60 wpm the DTU-1 should cycle the motor in the recorder 10 times in 114 seconds (91 seconds at 75 wpm.)

Many will probably be tempted to use the clocks in the UT-4 for those in the DTU-1 to save money. To try and do so will surely buy you a king-sized headache unless you are expert in TTL circuits. Tri it only if the DTU-1 is built in the same cabinet as the UT-4 so that the lead identified as (1) is only an inch or so long before it is divided down further. By passing the output of the 2nd (output) clock in the UT-4 through a buffer stage such as a 7400 and keeping the leads to only a couple of feet, the variable clock for the DTU-1 may be obtained from the UT-4. Be sure the buffer gate is as close to the 7473 as possible. The —12 volt supply can be taken from the UT-4 but not the +5 volts. The +5 volt supply is already near its maximum rating in most cases.

Construction hints:

The output from the clock circuit carrying the 450,909 hz should be as short as possible. All circuitry involving the opto isolater and bridge circuit should be placed as far from the TTL circuitry as possible. It is also a good idea to separate the motor control relay and its associated transistor from the other TTL circuitry. All leads to the control switches, especially to S-1, and S-2, should be kept as short as possible to prevent noise pickup and thus improper operation of the motor control circuitry. Note that on Fig. 3 the low side of the transformer primary is NOT connected to ground as ground as would generally be the case. This is because many of the cassette recorders have their audio output raised well above ground and grounding them would cause oscillation and probable destruction of their output transistors.

In the diagrams there are some diodes connected so as to perform the same function as a two input and gate such as the 7408. This chip may be used in place of these diodes. At the time my unit was constructed my junk box contained hundreds of 1N914 diodes but no and gates. I felt it best to present the circuit exactly as built rather than as I might have built it.

The unit draws near maximum for the LM309K regulator. This can be reduced by using 74LS series chips where such chips are available. The cost is not that much greater and the unit will run quite a bit cooler.

OOPS:

In the rush to get this article out a few goofs and omissions occurred in the drawings presented last month. Please make the changes shown below.

Fig. 1 The Uart is the General Instruments AY-5-1013 or equivalent. The FIFOs are Fairchild 3351 type. Both of the above are available from Peter Bertelli who will surely have an ad in the classified section. This is where I obtained these chips. He also has available the 74LS221 chips.

Fig. 2 IC 19 and 21 should show pins 3, 4, 7, 10 and 11 as grounded.

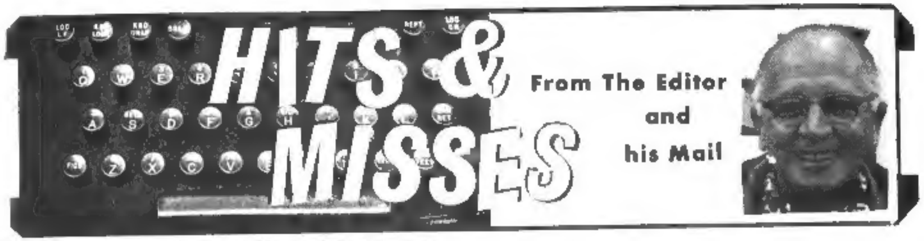
Fig 3 On IC 24 pins 3 and 11 were ommitted. They should be connected on the plus five volt supply.

Fig. 4 On IC 9 the 7493 change pin 8 to read pin 11.

Summary:

The DTU-1 was designed as a simple and reliable digital tape system utilizing an ordinary tape recorder. The buffer circuit was taken from the UT-4 to allow easy adaptation of the DTU-1 to the many circuits that have come out for the UT-4, such as: ASCII/Baudot and Baudot/ASCII converters, word edit systems and automatic CW ID systems. The principles used in the DTU-1 should find some use in the micro-processor field as well as in RTTY. With the DTU-1 you can get rid of the noisy, dirty, punch tape equipment and go modern with silent, magnetic tape.

*****



The RTTY JOURNAL is MOVING --

It is with mixed emotions that we announce a new publisher of the RTTY JOURNAL.

We are glad because the new publisher, Don Crumpet, W6KCW has the qualifications and facilities to continue the JOURNAL and improve it.

We are sad because it will mean less contact with all the wonderful people we have met and corresponded with and after ten and a half years, the JOURNAL has become part of our life.

I suppose it is similar to a favorite daughter getting married, you partially lose the daughter, but gain a bathroom and a telephone. The daughter however gains a new life and future.

The change will take place with the July-August issue. We will end our publishing with the May-June issue mailed abot the 20th of April. We will be at Dayton with the hospitality suite going full blast and hope to see many of you there. It is possible that the new publisher will also be able to make the Hamvention.

For the next month we will be in business as usual. In our last issue we will have a short sketch of the new Editor and his assistants. Any articles should be saved and submitted to the new publisher. We would also appreciate receiving only one month insertions for the classified section. We will be glad to receive current renewals but send future renewals - JULY and later until after the change.

Make a mental note now of the change, next month we will have full details. The new Publisher - Don Crumpton can be reached at 1155 Arden Dr., Encinitas, CA. 92024.

***

We have several articles, including an index of articles from 1976, that unfortunately, we cannot run this issue due to space limitations. The large growth of classified has pinched us for space. Hopefully this can be worked out in the near future.

***

Keith Petersen, W8SDZ, who will moderate the RTTY FORUM at Dayton informs us the time has been changed to Saturday from 2 to 4:30 P.M. from the original Sunday date. Keith will have a list of the speakers for next months issue and they promise to be good.

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BACK ISSUES

New subscriptions and classified ads are cash in advance as we have no method for billing. New subscriptions will be started with the current issue and one back issue, if requested. Please do not ask us to start any further back than this. Back issues - if available - may be ordered at 35 cents each at time of subscription. The JOURNAL is mailed about the 20th of the month preceding the dated month. May and June are a combined issue and July-August is a combined issue.

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NOV.- [5]
1976- APR.-SEPT.-OCT.-NOV.
DEC.-[5]
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A duplicate of any back issue may be obtained from R. Wilson, 4001 Clearview Dr., Cedar Falls, IA. 50613. $1.00 pp. Reprints of all UART articles. $2.00 pp.

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HAVE FULL SET OF RTTY JOURNALS. Will duplicate any issue $1.00 PP. Also duplicate of all 4 UART articles with large drawings. $2.00 PP. U.S., Canada, Mexico. Other countries 25 cents extra. R. Wilson, WB0ESF, 4011 Clearview Dr., Cedar Falls, IA. 50613.

SWAN 350 (late) with fsk, break-in cw, opposite sideband, and vox. 230XC and 14X supplies. $395. Regency HR-2 with crystals. $149. Need sockets for 4CX1000A and 4X150A. Stephen Budensiek, 805 East Second, Mitchell, S.D. 57301. 605-996-5733.

FOR SALE OR TRADE: MODEL 28 ASR's excellent condition with perf or reperf. Will deliver in New England. Trade or $450.00. George H. Rancourt, K1ANX, White Loaf Rd., Southampton, MA 01073. 413/527-4304.

TELETYPEWRITER PARTS: Gears, manuals, tools, paper, tape, Mod. kits, Gear shifts, ribbons, cranks, keytops, pallets, toroids. SASE for list. Typetronics, Box 8873, Ft. Lauderdale, FL. 33310. Buy unused parts, late machines.

DOVETRON MPC-1000R (E Series) REGENERATIVE RTTY TERMINAL UNIT retains all the features of the MPC-1000/MPC-1000C Terminal Units plus the benefits of the TSR-100 Teleprinter Speed Converter-Regenerator. Front panel controls permit signal speed selection (60, 67, 75, 100 WPM Baudot and 110 Baud ASCII), Memory Functions (Unload, Reset, Preload and Recirculate), and Character Rate Over-ride. Two front panel LEDs indicate the status of the Memory Section (Full or Empty) and the state of the TD inhibit line. The latter is controlled by a unique automatic memory unload circuit that prevents character over-runs even when pulling tape. The BLANK diddle character is generated by the tri-state mode of the UART regenerator and prevents a signal time-delay or first character error on the outputted signal. MPC-1000R: Commercial: $995.00. Amateur: $745.00. Shipping and Insurance: $9.50 Continental USA. Delivery: 30 days ARO. DOVETRON, 627 Fremont Avenue, South Pasadena, California, 91030. 213-682-3705.

SURPRISE! SURPRISE! 1702A programming at hobbyist prices! 1702A copied - $1, coding form input - $3. Add $9 for prime quality 1702A, or supply your own. Free erasing with order! Fast turnaround! Quantity discounts! SASE for free Hex forms and catalogue of microcomputer kits to: MICROTRONICS; P.O. Box 7454-R; Menlo Park, CA 94025.

PRINTED CIRCUIT BOARDS: RTTY SELCAL with TTL logic, (73 Magazine, November 72) $12.00. ST-5A-W/PS (2 boards) $6.25. AK-1, $4.25; CW ID'er (Feb 73, 73 Magazine) $4.75. Logic probe (Dec. 74, 73 Magazine) $1.00. Autostart RTTY encoder and decoder (Jan. 67, 73 Magazine) $11.00. Synthesizer 75-S Collins Rec. (Dec. 75, Ham Radio) 2 boards $12.50. Instructions and parts list included. S.J. Zalewski, 29307 Red Cedar Drive, Flat Rock, MI 48134. (313) 782-9316.

MODEL 28 ASR's – KSR's, Repurfs - Keyboards, TD's - Printers, Parts - All priced for Hams. All in excellent condition. A.D.M. Communications, Inc., 1322 Industrial Avenue, Escondido, Ca. 92025. (714) 747-0374

NEWS—NEWS—NEWS—Amateur Radio's Newspaper, "Worldradio", Trial subscription — Two issues for one dollar. "Worldradio" 2509-F Donner Way, Sacramento, Calif. 95818

FOR SALE — MODEL 28 ASR. Mint condition. Plenty of paper, tape and ribbons. Manuals included. $600. Irwin Schwartz, K2VGU, 260 65th Street, Brooklyn, NY 11220. (212)-745-4228.

DOVETRON TSR-200 TELEPRINTER SPEED CONVERTER-REGENERATOR is a 5" by 5" PC card designed to mount inside the MPC 1000/MPC 1000C and HAL ST-6 terminal units. It consists of a programmable UART Regenerator, a programmable Dual Xtal Controlled Clock and a CMOS Bilateral Steering Section, which provides automatic data and clock switching when the TU is switched between REC and XMIT. Power requirements are +5/+20 at 20 mils and -12/-20 at 5 mils. Availability: Stock. Amateur list price: $99.50 Postpaid USA. DOVETRON, 627 Fremont Ave., South Pasadena, CA. 91030.

RTTY PICTURE PERF TAPES. Hundreds, including nudes, cartoons, animals, works of art, landscapes, all of the RTTY Art Contests entries. Chad type (fully punched, no lids) 11/16 inch standard Amateur 5-level paper tape. Guaranteed COMPLETELY error-free. Run times from 2 minutes to 10 hours. Listing and info free if request typed on 5-level printer, otherwise send 24 cents in STAMPS. For "Intro Pack" of ten picture tapes of the best, various subjects, various lengths (total run time - 2 hours 12 minutes), send $6.00, immediate delivery, POSTPAID, listing included. Due to popularity of above, "Intro Pack Deluxe" now offered, run time 12 hours 44 minutes, $30.00, shipped PRIORITY mail in USA, surface postpaid overseas. Joe Dickens, WA9UGE, 601 S. Dodson, Urbana, IL 61801.

DOVETRON TELEPRINTER IDENTIFIER TID-100. Mounts inside of all Dovetron MPC Series (and ST-6) terminal units. CMOS circuitry requires less than 1 mil standby and 8 mils functioning. May be programmed for CW, Baudot or ASCII. 128 bit capacity. Two LEDS indicate CLOCK RUNNING and CODED OUTPUT for easy visual verification of programmed code. All four CMOS chips are socket-mounted and programming instructions are etched right on the circuit board. Includes 50 programming diodes: $34.95 postpaid. Factory programmed with DE and your call: $39.95 postpaid. DOVETRON, 627 Fremont Avenue, South Pasadena, California, 91030 213-682-3705.

28 ASR MK III, EXCELLENT OPERATIONAL CONDITION and appearance, keyboard reperf, answerback unit, double transmitters, auxiliary perforator. Will crate free, you pay shipping, $350. David D. Elsea, Box 218, Middletown, Virginia 22645.

FOR SALE — TDA 2 BIAS AND DISTORTION ANALYZER test set, excellent condition, factory calibrated with complete set of specs. and manuals, $40. Also 2 WU Deskfax's, excellent condition, with complete WU specifications, $35 for both. David D. Elsea, Box 218, Middletown, Virginia 22645.

EXPERT REPAIR WORK. Any Teletype Corp. model. Repair work $15.00 plus parts no matter how long it takes. Rebuilding by estimate. Write K9WRL or phone (312) 392-2358, ask for Neil.

QSL's, CATALOG 30 CENTS. TELETYPE PAPER single sheet rolls 12, 4½ inch rolls per case white, $25.00 per case plus shipping (case wt. 36 lbs.) N & S Print, P.O. Box 11184, Phoenix, Ariz. 85061.

AUTOMATIC CW ID UNITS. Programs up to 32 dots, dashes, or spaces, easily programmed. All on one board. Less 5V supply kit, $13.95, wired and tested $21.95 (your call must be supplied). Interface for above for ST5 or ST6, AFSK or FSK kit $4.50, wired and tested $5.75. Automatic 10 minute resetable timer for ID unit, kit $8.95, wired and tested $13.95. 5V 1A fully regulated short proof TTL supply with transformer and plug in or hard wired board. kit $11.95, wired and tested $18.95. SAVE on all four units, package of above reg. $39.35, kits sale price $35.99. Reg. wired and tested price $60.60, sale price $54.00. Cabinet for above, unpunched (Dozy E box) $7.75 each. Add 75 cents shipping. NuData Electronics, 104 N. Emerson St., Mt. Prospect, IL 60056

DOVETRON TSR-100 TELEPRINTER SPEED CONVERTER-REGENERATOR is a 6" by 7" PC card designed to mount inside of any MPC Series Terminal Unit and is intended to provide signal regeneration and UP-DOWN speed conversion. The 18 socket-mounted CMOS devices include a Uart, two FIFO Ripple Memories (80 characters), a programmable crystal-controlled Dual-Clock, and a bilateral steering section that permits solid-state switching between Transmit and Receive. All Uart functions including Parity are switch-selectable. Both sections of the Dual-Clock are programmable for 60, 67, 75, 100 WPM Baudot and 110 Baud ASCII codes. All 8 parallel data lines are available at the output of the Memory section. The TSR-100 also offers Variable Character Rate, BLANK Diddle and memory functions of Preload, Recirculate and Reset. The BLANK Diddle is Uart-generated (Tri-state mode) and does not contribute time delay or first character errors. A unique Memory Unload circuit prevents character over-runs and provides a TD Inhibit. A pair of LEDs indicate Memory status. All signal input and output ports are fully buffered for easy interface to other terminal units. Power requirements: +5/+15 volts at 85 mils and -12/-15 volts at 10 mils. TSR-100: $195.00. POSTPAID Continental USA. Delivery: 30 days or less. DOVETRON, 627 Fremont Avenue, South Pasadena, California, 91030. 213-682-3705.

MINI-MANUALS, $3.95 each postpaid - M15/19 Wiring Hints, Diagrams and schematics. CV89/URA8 FSK Converter data. TDA2 Stelma Distortion Analyzer, AN/SGC-1 AFSK Converter, conversion details, etc. Teletype Gear Guide. Schematic for CV57 FSK TU - $1.20 postpaid. Technical Manuals, Teletype Equipment and Parts, Surplus Electronics. SASE for lists. Jim Cooper, W2BVE, POB 73, Paramus, NJ 07652.

HAL COMMUNICATIONS CORP. announces the DS - 3000 and DS - 4000 series of KSR Video Display Terminals for Baudot and/or ASCII code. Offering error correction capability, multi-speed operation, and 16 lines of 72 characters per line, these terminals employ the 8080 microprocessor in what we believe is the first microprocessor based product offered to the amateur radio communications market. Request data sheet for full information. HAL COMMUNICATIONS CORP., Box 365RJ, Urbana, IL 61801. Phone 217-367-7373.

TECH MANUALS - $6.50 each: TT-63A/FGC, CV-591A/URR, TS-2/TG; following manuals - $8.50 each: R-388/URR, TH-5/TG, USM-50; other manuals - TGC-14/14A, $12.50; TT-298A/B, TT-299A/B, UGC-38, 40, 41 - $15.00. Model 14 TD manuals, $3.00 each. All manuals mostly new, unused. Thousands more in stock. Send 50 cents (coin) for large 22-page listing. W3IHD, 7218 Roanne Drive, Washington, D.C. 20021.

DOVETRON MPC-1000 (E Series) MULTIPATH-DIVERSITY RTTY TERMINAL UNIT. The new E Series represents the sixth generation and adds Automatic CRT Intensity Control, Keyboard-Actuated Autostart, Automatic Threshold Control for unattended operation, Fast-Slow Autostart, and Autostart Delayed-Timeout to the MPC's MULTIPATH CORRECTOR, IN-BAND DIVERSITY MODES, and the continuously variable Mark and Space channels. All IC's, transistors and Cmos logic elements are mounted in low-profile sockets for ease of servicing and maintenance. Interfacing to the TSR-100 or UT-4 speed converter/regenerator is accomplished by removing two jumpers at the rear panel. Your QSL brings full specifications. MPC-1000 (Amateur) $495.00. MPC-1000C (Commercial) $795.00. Shipping and Insurance: $7.50 Continental USA. Delivery: 30 days or less. DOVETRON, 627 Fremont Avenue, South Pasadena, California, 91030. 213-682-3705.

MODEL 28 KSR with a T.U. $275.00 or trade for HW 101. (714) 729-5581. W.H. Kuhlemeier, 4010 Trieste, Carlsbad, CA 92008.

WANTED — SET OF RTTY Journals Jan. '60 thru Dec. '76. Send price in first letter. R. Cobler, 120 James Lane, Nevada City, Calif. 95959.

HAL COMMUNICATIONS CORP: Headquarters for electronic RTTY equipment. In demodulators, choose from the incomparable ST-6 or, for a low cost beginning in RTTY, the ST-5. Tailor either to your requirements by selecting the 425 Hz press discriminator, the XTK-100 or AK-1 AFSK oscillators and the ST-5AS autostart for the ST-5. Full details available in our current catalog. Compare before you buy. Bank Americard and Master Charge plans available. HAL COMMUNICATIONS CORP., Box 365RJ, Urbana, Illinois 61801. Phone 217-367-7373.

FOR SALE — Two Model 19 Teletype Machines $90 each. Perfect shape. Two Model 14 Reperforators $35.00 each. One Western Union Model 103 Machine $35. One Model 5A Teletype Console (Model 15 in a console cabinet) $75. Tom Gibson, W3EAG, 855 Evansburg Road, Collegeville, PA. Phone 215-489-7039.

SALE: FEMALE JACK PANELS containing 144 jacks to a 19 inch panel takes standard ¼ inch plugs $19.00. Mite Motor, type PD/82U 115 VAC 60 Cy Unused $35.00. Kleinschmidt Allen wrench on 12" handle $1.00. Quick Brown Fox Generator Type TS-2B $39.00. Platen for Model 15 machines $9.00. Model 15 Carriage return strap $1.25. 2 copy roll paper (1 carbon) $2.75 per roll or case of 12 rolls $19.50. Machines, Parts, Gears, Manuals available - write us listing your needs. Atlantic Surplus Sales - 3730 Nautilus Ave. - Brooklyn, N.Y. 11224. (212) 372-0349.

35 KSR for computer hobbyist in excellent working condition $700.00 ea. friction or sprocket, A.D.M. COMMUNICATIONS INC., 1322 Industrial Ave., Escondido, Ca. 92025. 714-747-0374.

TELETYPE MANUALS - Model 28ASR, 3-volume set $24.50 plus $.75 postage. Thousands of other manuals available for military surplus receivers, xmtrs, teletype, radar, test sets. Send $.50 (coin) for large 22-page list. S. Consalvo, W3IHD, 7218 Roanne Drive, Washington, DC 20021.

28ASR FOR SALE — Absolutely mint Condition. Mark II Typing unit, typing reperf, TD, ESU, cabinet all excellent condition, $550. Prefer pick up, but will meet you any reasonable distance from Chicago. Joe. 312-690-9571.

Additional Classified on following pages. --

26TH DAYTON HAMVENTION AT HARA ARENA April 29, 30, May 1, 1977. Technical forums, exhibits, and huge flea market. RTTY forum on the 30th. Program brochures mailed March 7th, to those registered within last three years. For accommodations or advance flyer, write Hamvention, P.O. Box 44, Dayton, Ohio 45401.

THE DOVETRON DCM-100 is a poly-phase Direct Conversion Modem employing BASEBAND techniques that completely eliminate the need for input bandpass filtering and channel filters, permitting the error rate to approach the theoretical minimum. A high degree of selectivity is not required in the companion receiver, since this technique also eliminates all the image windows. The Mark and Space channels are both continuously tuneable from 1200 to 3000 Hertz and a dual LED display on each channel permits fast and precise tuning. Full IN-BAND Diversity provides automatic single channel copy during deep selective fades. Auto Markhold, anti-space and anti-CW are standard. FSK and MARK Autostart is offered, and the MARK Autostart is adjustable for Fast or Slow response. The high level loop supply is strappable for either 60 or 20 mil operation. The phase-continuous AFSK tone keyer may be preset with two different Mark-Space-Shift tone combinations, which are operator selectable from the front panel. Rear panel connectors permit plug-in interfacing of the speed-changing regenerators (including the Dovetron Microprocessor and the UT-4). The TSR-200 and TID-100 may be mounted internally. Twenty of the 25 integrated circuits are identical and all are socket mounted. All digital circuits are high noise-immunity CMOS. Availability: January 1977. Amateur list price: $295.00. FOB. DOVETRON, 627 Fremont Ave., South Pasadena, Ca. 91030.

FOR SALE: TELETYPE MACHINES. Model 28ASR, typing KBD and Aux reperfs, non-interfering tape feed-out. MK III, excellent condition, 60 or 100 WPM, $450.00. Model 28 KSR, MK III, excellent condition, 60 or 100 WPM $250.00. Model 28 RO, variable speed motor, new, $150.00. Model 35 off-line typing KBD tape punch, excellent condition, $125.00. Kleinschmidt TT-99, working condition, make offer. James E. Nicholson, WA4RWX, 4006 Moss Drive, Annandale, Virginia 22003 (703) 256-9572.

DOVETRON'S NEWEST PRODUCT is the TSR-500 SPEED CONVERTER-REGENERATOR. In addition to Signal Regeneration, Up-Down Speed Conversion, Buffer Storage, Variable Character Rate, Blank/LTRS Diddle and Tee Dee Inhibit, the TSR-500 is expandable to 200 characters of FIFO memory and features ERROR CORRECTION. Incorrect and mis-spelled words may be dumped from the Input FIFO without disturbing information stored in the rest of the memory section. A SECOND UART provides local teleprinter copy in the Receive-PRELOAD and Send-RECIRCULATE modes of operation. Both UARTs are the new Intersil CMOS IM6402 and may be programmed for 1.5 character unit Stop Bit in the 5 level Baudot code. Designed for installation within the MPC-1000R Regenerative RTTY TU, the TSR-500 also makes an excellent stand-alone peripheral. Best of all, the price (with 2 FIFOs) is the same as the original TSR-100: $195.00 Postpaid USA. Additional FIFO storage: $25.00 per 40 characters. DOVETRON, 627 Fremont Avenue, South Pasadena, Calif., 91030. 213-682-3705.

MODEL 28 ASR CONSOLES w/tape unit $325 ea. Loads of 15's, 19's, and 28's -- table models, tables, TD's, motors, keyboards, etc. -- cheap. Goodman, 5454 South Shore Drive, Chicago, IL 60615 (312) 752-1000.

SELL: Collins 32V3, Collins R392 with converter and p/s, 28 KSR page printer, CV 89A converter, manuals - $600.00. Joseph Schwartz, 43-34 Union Street, Flushing, N.Y. 11355 (212) 461-3632.

HAL COMMUNICATIONS CORP. announces the ST-6000 RTTY Demodulator/Keyer. The ST-6000 is ideally suited for amateur or commercial service offering fixed 850, 425, and 170 Hz shifts for ease of tuning. Standard low and high tone frequency pairs are available, and active filter design allows the use of any set of tone pairs between 1200-3000 Hz. Crystal controlled tone keyer for stability. Self-contained loop supply RS-232C, and MIL-188-C levels for I/O. Scope or meter tuning. Keyboard operated switch. Selectable ATC, and new DTH (decision threshold hysteresis) circuitry allows optimum performance under the most demanding conditions. Complete flexibility in the interconnection of the demodulator and tone keyer allows separate, half duplex, or full duplex operation. Usable at all data rates up to 110 baud ASCII in standard form. The ST-6000 carries the usual HAL one-year warranty, and is an ideal companion to our new DS-3000 KSR microprocessor based communications terminal. Write today for full details. HAL Communications Corp., Box 365RJ, Urbana, Ill. 61801. Phone 217-367-7373.

COMPUTER ELECTRONIC KEYBOARD CAB—INETS. Two sizes. Each has 14 x 6.3 inch keyboard surface with a 15 degree slope. Full sizes are 14W 8.3D 3H and 14W 11.3D 3H. 14x8.3x3 cabinet $14.90. 14x11.3x3 cabinet $16.49. Add $1.00 for shipping. Blue base with choice of white or black top. NuData Electronics, 104 N. Emerson St., Mt. Prospect, IL 60056.

500 LABELS ON GOLD PAPER - return address with CALL, up to 4 lines, beautiful $1.00 post pd. QSL's regular or double style Printed, low cost, post pd., details S.A.S.E. D M T Printing - RJ, 390 Lincoln Ave., Newark, N.J. 07104.

HAL COMMUNICATIONS CORP. announces the MCEM-8080 microcomputer. The MCEM-8080 is a complete operating system on a single PC board, including serial I/O at RS-232C levels or 20-60 ma current loop, 3 parallel I/O ports, 1024 bytes of RAM, 1024 bytes of ROM containing the system monitor program, and switches and indicators to manually control all bus and control lines. The powerful 8080A CPU and its family of chips are used. The system monitor allows the use of either Baudot or ASCII terminals, and enables the user to load hex files, dump or display memory, insert data in memory and transfer program control to a specific location. Whether you are a RTTY operator turned computer hobbyist, or a computer hobbyist turning to RTTY for a communications link, the MCEM-8080 should be your choice. Write today for full details. HAL Communications Corp., Box 365RJ, Urbana, Ill. 61801. Phone 217-367-7373.

TELETYPE EQUIPMENT and SUPPLIES Models 14, 15, 28. Fresh roll paper F.O.B. Rochester (case of 12) 4½ inch dia., $17.50, 5 inch, $21.00. Fresh Teletype ribbons, $1.80 pp. Model 15 keytop conversion to communications, $3.50 pp. Large selection of parts for 14, 15, 19, 28 equipment. Please give type of equipment, part number and description with parts inquiries. Model 28 typing unit for parts or repair $25. SASE for equipment list. See you at Dayton. P. Andersen, 115 Boyken Rd., Rochester, MI 48063. 313/652-3060.

SALE: TT/L-2/CUSTOM BUILT $150; 28 ASR with typing reperf; KW-1 $425. Jack Lippincott, 458 Hawthorne, Webster Groves, Mo. 63119.

"PICTURE NUTS" - TELETYPE "LXRB" REPERF/TEE DEE - variable speed, store several rolls of perforated tape - ideal for picture receiving, storing and retransmitting -- see Feb., 1972 Journal article for details. K7BV, 4091 West Wing Street, Tucson, Arizona 85704. $150 or trade for mint 28 Tee Dee stand alone Tee Dee.

DOVETRON MPC-1000R REGENERATIVE RTTY TERMINAL UNIT is the logical combination of the MPC-1000C and the **new** TSR-500 Speed Converter-Regenerator. The Memory Section may be loaded with up to 5 FIFOs for a total of 200 characters of storage. A **second** UART provides local teleprinter copy during Receive-PRELOAD and Send-RECIRCULATE. ERROR CORRECTION has been provided and incorrect and mis-spelled words may be erased from the Memory Section by pressing the local keyboard's BLANK key. Front panel controls permit Signal and Loop speed selections of 60, 67, 75, 100 WPM Baudot and 110 Baud ASCII. BLANK DIDDLE, Tee Dee INHIBIT and VARIABLE CHARACTER RATE are standard features. The optional CW IDer (TID-100) displays its coded output on a front panel LED. Both UARTS are the new Intersil CMOS IM6402 and permit a 1.5 CU Stop Pulse. Amateur List: $745.00 with 80 character Memory. $820.00 with 200 characters. Delivery: 30 days ARO. DOVETRON, 627 Fremont Avenue, South Pasadena, California, 91030. 213-682-3705.

UT-4 COMPONENTS. UART $7.00, FC-33512DC FIFO's $14.00 each. MC3408L D/A $4.50, SN74221 $1.25 each. UT-4 TTL kit (12 TTL, NPN's, diodes, opamp) $8.50. See article this issue for XB-6XK crystal kit option, $3.00. XB-6XK TTL kit (12 TTL, 14 ¼ watt R's and crystal) $10.50. Edge connectors and original XB-6 crystal no longer stocked. IC sockets (29) $8.00. All postpaid. Peter Bertelli, W6KS, 5262 Yost Place, San Diego, CA. 92109. 714-274-7060.

RARE MICROMINIATURE MITE TT-119A Page Printer. Fits in your hand. Uses standard adding machine paper and includes 60 - 100 wpm decoder and case. See MAY 1976 **RTTY JOURNAL** page 2. TRADE ONLY! on ASCII page printer. WA5EVH, Rick Bourgeois, BOX 2746, Lafayette, LA 70502 (318)-234-1910.

AFSK OSCILLATOR uses active filter instead of toroids. IC oscillator insures stable operation. 170 and 850 Hz shift. CW ID keying input. Wire in or use PC edge connector. Plug-in replacement for AK-1 universal mounting. Measures 2 5/8" x 2 7/8'. Kit includes etched and drilled PC board, all necessary parts and instructions. (Power supply not included). Order FS-1 kit ($21.00 or FS-1 wired ($29.00) from Flesher Corp., P.O. Box 902, Topeka, Kansas (66601. BankAmericard, Master Charge, phone orders accepted (913-234-0198). No C.O.D.

ACTIVE FILTER DEMODULATOR for 170 Hz shift. Has anti-space, autostart output with adjustable threshold, start delay and stop delay. Available kit or wired. Circuit board measures only 2.95 X 5.25 inches and is notched for 12 pin edge connector. Available wired ($59.95) or in kit form ($39.95). Called the DM-170, the demodulator employs cascaded stages of stable low Q RC active filters for high stability and easy alignment. A lowpass filter and hsteresis slicer improve copy under marginal conditions. Oscilliscope "+" display outputs, and tuning meter output. Loop keyer and autostart relay driver transistors included on the board. High quality epoxy-glass etched, drilled and plated board. Instructions included. Flesher Corp., P.O. Box 902, Topeka, Kansas 66601. BankAmericard, Master Charge and Vista phone orders accepted. (913-234-0198). No C.O.D.

STATION TIMER WITH LED DISPLAY - Single digit LED displays minutes since last I.D. Positive going output pulse every 10 minutes can trigger automatic ID'er or tone oscillator. Complete with all parts, drilled and plated circuit board, and instructions. Order TMT kit ($19.50) or wired $24.95, from Flesher Corp., P.O. Box 902, Topeka, Kansas 66601. BankAmericard, Master Charge, phone orders accepted (913-234-0198). No C.O.D.

ST-6 CW IDENTIFIER designed for HAL ST-6 terminal unit. Plug in circuit board measures 2.75" x 5". Will work with most other keyers. Easiest to program 127 bit diode matrix, adjustable speed, sidetone speaker output. Can be programmed for RTTY-ID. Complete kit for HAL ST-6 includes 50 programming diodes; $26.50. Wired and programmed: $36.50. Flesher Corp., P.O. Box 902, Topeka, Kansas 66601. BankAmericard, Master Charge, phone orders accepted (913-234-0198). No C.O.D.

SALE: BLACK NYLON RIBBONS for all your Teletype machines $6.75 a dozen, Red and Black Nylon ribbons dual spool $1.50 each or $12.00 dozen, Roll paper white 5" diameter $2.50 roll or case of 12 rolls $19.50. Perforator Tape 11/16 inch wide by eight inch diameter. Box of 10 rolls $4.90 or case of 40 rolls $15.90. Black Nylon ribbons for Kleinschmidt $1.50 each or dozen for $10.75. Tuning Forks 96.19 VPS or 120 VPS $2.50 each. Distortion test set type TDA-2 with Scope $39.00. Also available Model 14, 15, 19, 28, 32, 33 machines. Send us a list of your Teletype requirements. All prices FOB Brooklyn, N.Y., Atlantic Surplus Sales Co., 3730 Nautilus Ave., Brooklyn, N.Y. 11224. Tel: (212) 372-0349.

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The XB-6XK CRYSTAL OPTION

PETER BERTELLL,W6KS
5262 Yost Place
SAN DIEGO, CA. 92109

The low-cost crystal for the XB-6 crystal clock used with the UT-4 has fallen victim to inflation. Without prior notice, JAN CRYSTALS has recently hiked their price by $1.00. As a result, I will no longer have it available.

Last year, in anticipation of such a move, I worked out an optional xtal/divider scheme to permit use of an available high grade military surplus crystal in a slightly smaller holder. No circuit changes are involved - just a plug-in replacement of the primary decade divider (7490). The frequency into the programmable divider strings remains the same as before (450.09 khz).

Unfortunately, the surplus crystals are not available in single units but I have obtained a good supply and can furnish a kit of the crystal and the chip for less than the price of the original XB-6 crystal alone. To identify it I have labelled it the "XB-6XK" crystal kit. See classified ad in this issue.

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